

CALIFORNIA HIGH-SPEED TRAIN

Project Environmental Impact Report /
Environmental Impact Statement

DRAFT

Fresno to Bakersfield Section Summary

August 2011



CALIFORNIA
High-Speed Rail Authority



U.S. Department of Transportation
Federal Railroad Administration



CALIFORNIA HIGH-SPEED TRAIN PROJECT EIR/EIS

DRAFT

The California High-Speed Train Project
Environmental Impact Report/ Environmental
Impact Statement
and

DRAFT

Section 4(f) Statement

Fresno to Bakersfield Section

SUMMARY

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S.0 Summary

S.1 Introduction and Background

The California High-Speed Rail Authority (Authority), a state governing board formed in 1996, has responsibility for planning, designing, constructing, and operating the California High-Speed Train (HST). Its mandate is to develop a high-speed rail system coordinating with the state's existing transportation network, which includes intercity rail and bus lines, regional commuter rail lines, urban rail and bus transit lines, highways, and airports.

The California High-Speed Train System (HST system) will provide intercity, high-speed service on more than 800 miles of tracks throughout California, connecting the major population centers of Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. Figure S-1 shows this system. It will use state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology, including contemporary safety, signaling, and automated train-control systems, with trains capable of operating up to 220 miles per hour (mph) over a fully grade-separated, dedicated track alignment.

High-Speed Train System

The system that includes the HST guideways, structures, stations, traction-powered substations, and maintenance facilities.

The Authority plans two phases. Phase 1¹ will connect San Francisco to Los Angeles/Anaheim via the Pacheco Pass and the Central Valley with a mandated express travel time of 2 hours and 40 minutes or less. Phase 2 will connect the Central Valley to the state's capital, Sacramento, and will extend the system from Los Angeles to San Diego.

The Fresno to Bakersfield HST Section, shown in Figure S-2, is a critical Phase 1 link connecting to the Merced to Fresno and Bay Area HST sections to the north and the Bakersfield to Palmdale and Palmdale to Los Angeles HST sections to the south. The Fresno to Bakersfield Section includes HST stations in the cities of Fresno and Bakersfield, with a third potential station located in the vicinity of Hanford (Kings/Tulare Regional Station) that would serve the Hanford, Visalia, and Tulare area. The Fresno and Bakersfield stations are this section's beginning and ending points, or project termini.

S.2 Tiered Environmental Review: Final Statewide Program EIR/EIS and Fresno to Bakersfield Section Project EIR/EIS

The Council on Environmental Quality provides for National Environmental Policy Act (NEPA) decision-making through a phased process. This process is referred to as *tiered* decision making. This phased decision-making process provides for a broad-level programmatic decision at the first tier, with a first-tier environmental impact statement (EIS), to be followed by more specific decisions at the second-tier, with one or more second-tier EISs. The NEPA tiering process allows for incremental decision-making for large projects that would be too extensive and cumbersome to analyze in a traditional project EIS. The California Environmental Quality Act (CEQA) also encourages tiering and also provides for first-tier and second-tier environmental impact reports (EIRs).

The Fresno to Bakersfield Section EIR/EIS is a second-tier EIR/EIS that tiers off two first-tier, program EIR/EIS documents, and provides project-level information for decision-making on this

¹ Phase 1 would be built in stages dependent on funding availability.

portion of the HST system. The 2005 *Final Program EIR/EIS for the Proposed California High-Speed Train System EIR/EIS* (Statewide Program EIR/EIS) (Authority and Federal Railroad Administration [FRA] 2005) provided a first-tier analysis of the general effects of implementing the HST System across two-thirds of the state. The 2008 *Bay Area to Central Valley HST Final Program EIR/EIS* (Bay Area to Central Valley Program EIR/EIS) (Authority and FRA 2008), and the Authority's 2010 Revised Final Program EIR (Authority 2010) for the Bay Area to Central Valley HST, were also first-tier and programmatic, but focused on the Bay Area to Central Valley region. These first-tier EIR/EIS documents provided the FRA and the Authority with the environmental analysis necessary for the evaluation of the overall HST System, and for making broad decisions about general high-speed train alignments and station locations for further study in second-tier EIR/EISs. These documents are available on the Authority's website: www.cahighspeedrail.ca.gov. The Fresno to Bakersfield Section EIR/EIS analyzes the environmental impacts and benefits of implementing the high-speed train in the more geographically limited area between Fresno and Bakersfield, and is based on more detailed project planning and engineering. The analysis therefore builds on the earlier decisions and program EIR/EISs, and provides more site-specific and detailed analysis.

S.3 Issues Raised during the Scoping Process

The Authority held five public scoping meetings were held between March 18 and March 26, 2009, in the Fresno to Bakersfield Section project corridor, with a total of 400 people attending the five meetings. Scoping helps determine the focus and content of an EIR/EIS. The Authority and FRA received a total of 188 comments from individuals and organizations, as well as comments from 33 agencies, on the proposed project. Major issues identified as a result of scoping follow:.

- Visual impacts of the project in general, stations, elevated track, glare.
- HST emissions, particularly dust and its effects on agriculture.
- Conversion of agricultural land to nonagricultural uses.
- Compliance with the Williamson Act.
- Impacts on farm operations.
- Impacts on low-income and minority communities.
- Impacts on community cohesion.
- Fiscal impacts on the state and local jurisdictions.
- Construction impacts.
- System safety with regard to derailments.
- Growth-inducing effects of new transportation system in the San Joaquin Valley.
- Water resource impacts.
- Harm to historic structures.
- Hazardous materials impacts.
- Electromagnetic field impacts on humans and animals.
- Impacts on special-status species and their habitats.
- Noise impacts.
- Transportation impacts: crossings, blocked roads, blocked intersections, congestion if the HST is not implemented.
- Impacts on Amtrak.
- Global warming effects if the HST is not implemented.



Figure S-1
California HST System initial study corridors

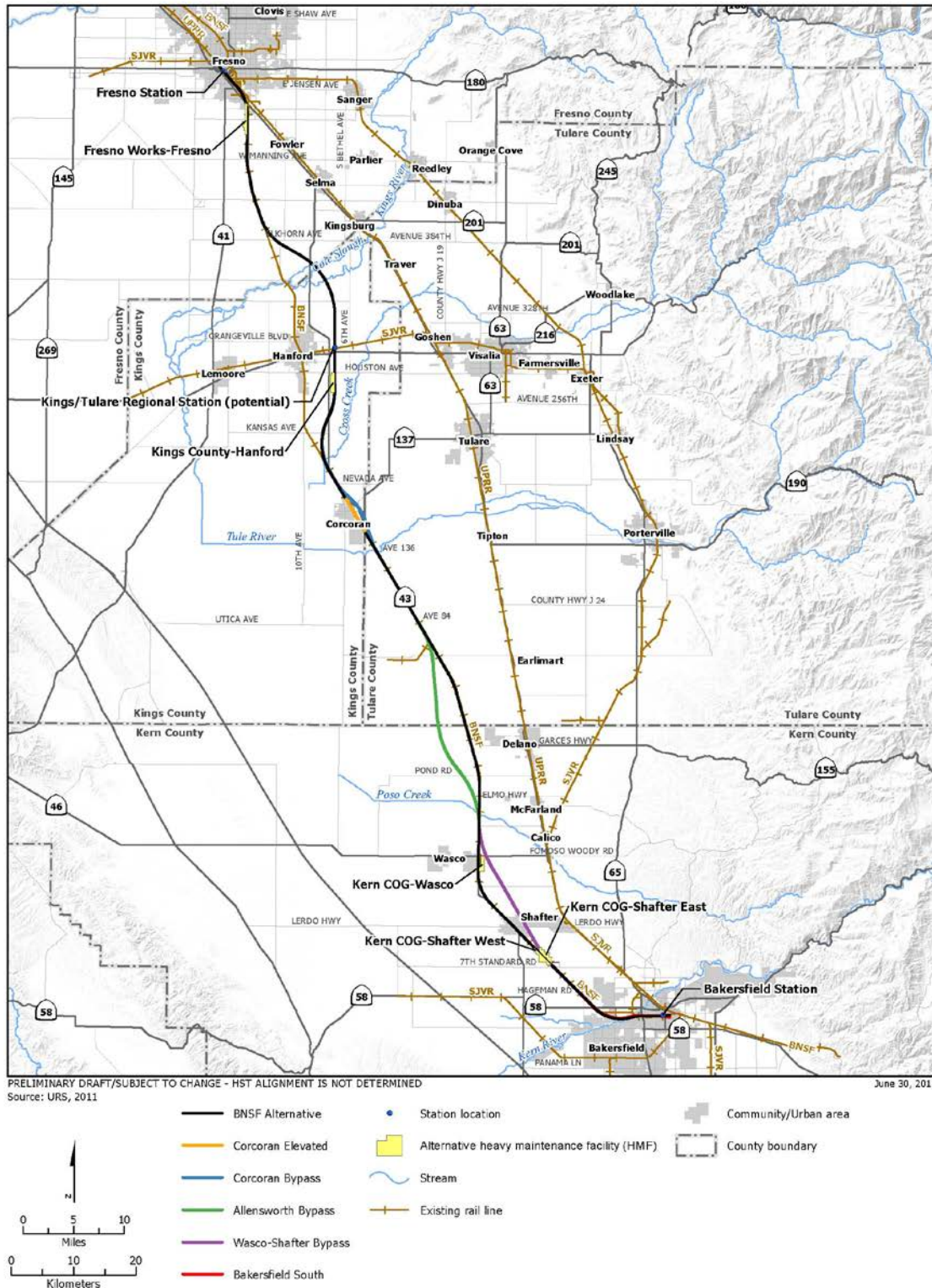


Figure S-2
Fresno to Bakersfield Section project alternatives

S.4 Purpose of and Need for the HST System and the Fresno to Bakersfield Section

S.4.1 Purpose of the HST System

The purpose of the California HST System is to provide a reliable high-speed electric-powered train system that links the major metropolitan areas of the state, and that delivers predictable and consistent travel times. A further objective is to provide an interface with commercial airports, mass transit, and the highway network, and to relieve capacity constraints of the existing transportation system as increases in intercity travel demand in California occur, in a manner sensitive to and protective of California's unique natural resources.

S.4.2 Purpose of the Fresno to Bakersfield Section

The purpose of this project is to implement the Fresno to Bakersfield Section of the California HST System to provide the public with electric-powered high-speed rail service that provides predictable and consistent travel times between major urban centers and connectivity to airports, mass transit, and the highway network in the south San Joaquin Valley and connects the northern and southern portions of the system.

S.4.3 Objectives for the HST System Statewide and Within the Central San Joaquin Valley Region

The Authority has responded to its mandate to plan, build, and operate an HST system that is coordinated with California's existing transportation network by adopting the following objectives and policies for the proposed HST system:

- Provide intercity travel capacity to supplement critically over-used interstate highways and commercial airports.
- Meet future intercity travel demand that will be unmet by current transportation systems, and increase capacity for intercity mobility.
- Maximize intermodal transportation opportunities by locating stations to connect with local transit, airports, and highways.
- Improve the intercity travel experience for Californians by providing comfortable, safe, frequent, and reliable high-speed travel.
- Provide a sustainable reduction in travel time between major urban centers.
- Increase the efficiency of the intercity transportation system.
- Maximize the use of existing transportation corridors and rights-of-way, to the extent feasible.
- Develop a practical and economically viable transportation system that can be implemented in phases by 2020 and generate revenues in excess of operations and maintenance costs.
- Provide intercity travel in a manner sensitive to and protective of the region's natural and agricultural resources and reduce emissions and vehicle miles traveled for intercity trips.

The approximately 114-mile-long Fresno to Bakersfield Section is an essential part of the statewide HST System. As part of the Central Valley section of the HST system, it would provide

Fresno, Visalia, Tulare, Hanford, and Bakersfield access to a new transportation mode, and would contribute to increased mobility throughout California. This section will connect the south San Joaquin Valley region to the rest of the statewide HST system via Fresno, Kings, Tulare, and Kern counties (see Figure S-1).

S.4.4 Need for the HST System Statewide and Within the South San Joaquin Valley Region

The need for an HST system exists statewide, with regional areas contributing to this need. The Fresno to Bakersfield Section is an essential component of the statewide HST system.

The capacity of California's intercity transportation system, including the south San Joaquin Valley region, is insufficient to meet existing and future travel demands, and the current and projected future congestion of the system will continue to result in deteriorating air quality, reduced reliability, and increased travel times. The current transportation system has not kept pace with the increase in population, economic activity, and tourism within the state, including that in the south San Joaquin Valley region. The interstate highway system, commercial airports, and conventional passenger rail system serving the intercity travel market are operating at or near capacity and will require large public investments for maintenance and expansion to meet existing demand and future growth over the next 25 years and beyond. Moreover, the feasibility of expanding many major highways and key airports is uncertain; some needed expansions might be impractical or are constrained by physical, political, and other factors. The need for improvements to intercity travel in California, including intercity travel between the southern San Joaquin Valley, the Bay Area, Sacramento, and Southern California relates to the following issues:

- Future growth in demand for intercity travel, including the growth in demand within the south San Joaquin Valley region.
- Capacity constraints that will result in increasing congestion and travel delays, including those in the south San Joaquin Valley region.
- Unreliability of travel stemming from congestion and delays, weather conditions, accidents, and other factors that affect the quality of life and economic well-being of residents, businesses, and tourism in California, including the south San Joaquin Valley region.
- Reduced mobility as a result of increasing demand on limited modal connections between major airports, transit systems, and passenger rail in the state, including the south San Joaquin Valley region.
- Poor and deteriorating air quality and pressure on natural resources and agricultural lands as a result of expanded highways and airports and urban development pressures, including those within the south San Joaquin Valley region.

Geographically, the Fresno to Bakersfield Section is located in the center of California. This region significantly contributes to the statewide need for a new intercity transportation service that would connect it with the major population and economic centers and to other regions of the state. The major population, economic, and political centers are located on the coasts of Northern and Southern California and in the Sacramento Valley.

S.5 Alternatives

This section summarizes the alternatives evaluated in the Draft Fresno to Bakersfield Section Project EIR/EIS. The 2005 Statewide Program EIR/EIS (Authority and FRA 2005), the 2008 Bay Area to Central Valley Program EIR/EIS (Authority and FRA 2008), public and agency input from

the scoping process, extensive local and agency involvement during Technical Working Group² (TWG) meetings, and other stakeholder meetings provided input to the Authority in developing these alternatives.

The track alignment, stations, and heavy maintenance facility (HMF) have been through an alternatives analysis screening process, which considered the effects of the alternatives on the social, natural, and built environment. The screening was performed in collaboration with teams for the adjacent Merced to Fresno Section where the Fresno to Bakersfield and Merced to Fresno sections overlap. In addition to the HST alternatives, a No Project Alternative and HMF alternatives were studied. The HMF would support the assembly, testing, commissioning, and acceptance of high-speed train vehicles (rolling stock) prior to the start-up of operations. After initial operations begin, the HMF would assume maintenance and major repair functions to sustain the regular system operation and assembly of new rolling stock.

S.5.1 No Project Alternative

The No Project Alternative is the basis for comparison of the HST alternatives. The No Project Alternative represents the state's transportation system (highway, air, bus, conventional rail) as it is currently and as it would be after implementation of programs or projects that are currently projected in regional transportation plans (RTPs), have identified funds for implementation, and are expected to be in place by 2035, as well as any major planned land use changes. The entire San Joaquin Valley is projected to grow at a rate higher than any other region in California. The four counties—Fresno, Kings, Tulare, and Kern—are projected to continue to grow at an average of about 3% per year. By 2035, the four-county study area will grow from a 2010 population of 2,397,451 to 4,127,624 for a net increase of 1,730,173 people, or 72%. Accommodating this new population will require land and necessitate the construction of new infrastructure, including roadways, electric power generation, water and wastewater facilities, sewer, schools, hospitals, and commercial and industrial facilities. To support this growth, development would consume an estimated 173,000 acres because, according to current planning trends, these counties would develop at a density of approximately 10 persons per acre (see Section 2.4.1, No Project Description, for justification).

S.5.2 Fresno to Bakersfield Section High-Speed Train Alternatives

This EIR/EIS evaluates six HST alternatives: the BNSF Alternative, the Corcoran Elevated Alternative, the Corcoran Bypass Alternative, the Allensworth Bypass Alternative, the Wasco-Shafter Bypass Alternative, and the Bakersfield South Alternative. Figure S-2 shows the six alternatives carried forward in this EIR/EIS. They would extend between and include the proposed Downtown Fresno and Downtown Bakersfield stations, and a potential Kings/Tulare Regional Station located east of Hanford. The estimated trip time between the Fresno and Bakersfield stations would be approximately 40 minutes. The three stations would see a mix of stopping trains and through trains; the number of trains would peak after the system has been built out. Scenarios were developed to take into account various levels of ridership that could occur. In 2035 for the high ridership scenario, the full system would see four trains per hour stop at each of the Fresno, potential Kings/Tulare Regional, and Bakersfield stations in each direction at the peak, and six trains run through. At the off-peak, the same number of stops would be made, but the through trains would decrease to three per hour.

The BNSF Alternative is a single continuous alignment that extends from the northern end of the Fresno station tracks to the southern end of the Bakersfield station tracks. This is the alternative that most closely follows the preferred alignment identified in the Statewide Program EIR/EIS

² Technical Working Groups were composed of senior staff from county and city public works, planning, economic development, and administrative departments.

(FRA 2005). It begins in Downtown Fresno on the west side of the Union Pacific Railroad (UPRR) tracks, proceeds south through Fresno adjacent to the UPRR tracks, crossing under East Jensen Avenue and then over Golden State Boulevard and SR99 as it curves south to join the BNSF Railway. The BNSF Alternative diverges from the BNSF Railway north of the Kings River and travels east of the city of Hanford before rejoining the BNSF Railway on its western side, north of the city of Corcoran. From there, the BNSF Alternative follows the BNSF Railway south through Corcoran, Wasco, and Shafter into the Bakersfield Metropolitan Area where it generally follows the BNSF Railway corridor through Bakersfield to the Bakersfield Station.

The additional five alternative alignments diverge from the BNSF Alternative at various locations between Fresno and Bakersfield. The Corcoran Elevated Alternative would be the same as the corresponding segment of the BNSF Alternative except that it would pass through the city of Corcoran on the eastern side of the BNSF Railway right-of-way on an elevated structure. The Corcoran Bypass Alternative would diverge from the BNSF Alternative at approximately Nevada Avenue and swing east of Corcoran, rejoining the BNSF Alternative at Avenue 136 south of Corcoran. The Allensworth Bypass Alternative would diverge from the BNSF Alternative at Avenue 84 in Tulare County and swing west of Allensworth State Historic Park, rejoining the BNSF Alternative at Elmo Highway in Kern County. The Wasco-Shafter Bypass Alternative would diverge from the BNSF Alternative between Sherwood Avenue and Fresno Avenue, bypassing Wasco and Shafter to the east, and rejoin the BNSF Alternative at 7th Standard Road. The Bakersfield South Alternative parallels the BNSF Alternative from Rosedale Highway (SR 58) to Chester Avenue at varying distances to the north. The alternative then curves south, and parallels California Avenue to its terminus at the southern end of the Bakersfield station tracks.

S.5.3 Station Area Development

The presence of an HST would provide tremendous opportunities to revitalize the downtowns of Fresno and Bakersfield through urban design; diversity of higher density mixed use development; and improved transit, bike, and pedestrian connectivity. The higher densities in the station areas would result in higher levels of transit and the stations could become major transit hubs. The presence of the stations would also attract office development to the downtown areas because of the improved access to the larger markets of Los Angeles and the Bay Area, and the stations could become 24-hour destinations as more commercial businesses are attracted to the area. In addition, residential growth would be expected as a result of increases in retail, nightlife, and improved multimodal connectivity, which could lessen the desire of residents to commute to Los Angeles or the Bay Area (Authority and FRA 2008).

The cities of Fresno and Bakersfield are updating their general plans to reflect the addition of an HST station in their downtown areas. Both downtowns are poised to become strong activity centers with the addition of the HST. The projected growth for this region is approximately an additional 1.6 million persons by 2035, with comparable growth in employment even before adding the HST to the Central Valley. The project is estimated to bring 8,400 and 9,200 daily passengers to Fresno and Bakersfield respectively, and, when combined with the projected growth for the valley, would result in an abundance of people in the downtown areas. The HST would provide a catalyst to concentrate the investment created by population growth at the urban centers that provide interregional connectivity with other metropolitan centers. The Fresno and Bakersfield HST stations would be compatible with local zoning for higher density development and would build upon existing activity centers. The station areas and the surrounding regions would realize beneficial effects, including increased employment, recreation, and community cohesion. No incompatible changes in land use patterns or intensities are anticipated.

The Kings/Tulare Regional Station is one of the few stations in the California HST System that is not proposed in a downtown urban area. The site for this station was selected to serve residents

in the Lemoor/Hanford, Visalia, and Tulare areas. It is located immediately east of the city of Hanford's primary sphere of influence adjacent to the intersection of SR198 and SR43. These two highways would provide access to the station for shuttle bus service from the communities in the area. The proposed Kings/Tulare Regional Station site has the largest population within a 20-mile area of any of the sites considered for this regional station. The 2007 population within the 20-mile catchment area for the Kings/Tulare Regional Station site was 424,700, projected to increase to 683,300 people by 2030 (Authority 2007).

Hanford and Kings County land use designations and zoning for the site are compatible with an HST station; however, the site and surrounding land is currently in agricultural production, and Hanford wishes to direct future growth towards the western side of the city instead of the east. The Authority would work with the city and county to develop a station area plan that protects agricultural use of the lands between Hanford and Visalia. This would include limiting parking spaces at the Kings/Tulare Regional Station and providing additional parking, as appropriate, at transit centers in the cities served by the station. The Authority would also acquire agricultural conservation easements in the vicinity of the station as part of mitigation for project impacts to agricultural land.

S.5.4 Heavy Maintenance Facility

The Fresno to Bakersfield Section may include an HMF centrally located on the main north-south line of the HST System to support delivery, testing, and commissioning on the network's first completed segment. The HMF concept plan indicates that the site should encompass approximately 150 acres to accommodate guideways, maintenance shops, parking, administrative offices, roadways, power substation, and storage areas.

The HMF would perform the following functions:

- Trainset assembly
- Testing and commissioning
- Train storage
- Inspection
- Maintenance
- Retrofitting
- Overhaul

This EIR/EIS evaluates five HMF site alternatives (refer to Chapter 2, Alternatives) that are shown on Figure S-2:

- Fresno Works–Fresno HMF Site – Located within the southern limits of the city and county of Fresno next to the BNSF Railway right-of-way between SR 99 and Adams Avenue.
- Kings County–Hanford HMF Site – Located southeast of the city of Hanford, adjacent to and east of SR 43, between Houston and Idaho avenues.
- Kern Council of Governments–Wasco HMF Site – Located east of the city of Wasco between SR 46 and Filburn Street.
- Kern Council of Governments–Shafter East HMF Site – Located in the city of Shafter on the eastern side of the BNSF Railway right-of-way between Burbank Street and 7th Standard Road.

HST Heavy Maintenance Facility

The California HST HMF would support the assembly, testing, commissioning, and acceptance of high-speed rolling stock prior to the start-up of operations. After initial operations begin, the HMF would assume maintenance and major repair functions to sustain the regular operation of the system and activation of new rolling stock as it is delivered.

- Kern Council of Governments–Shafter West HMF Site – Located in the city of Shafter on the western side of the BNSF Railway right-of-way between Burbank Street and 7th Standard Road.

S.6 Measures to Avoid and Minimize Impacts

The HST project includes alternatives and design features to avoid and minimize impacts. Project design incorporates the following measures:

- Follows existing transportation corridors to the extent feasible
- Uses shared right-of-way when feasible
- Narrowed footprint with elevated or retained cut profile
- Spans water crossings where practical
- Includes passages for wildlife movement
- Avoids sensitive environmental resources to the extent practical

S.7 No Project Alternative Impacts

Projected growth and conversion of land to urbanized uses associated with the No Project Alternative are anticipated to have the greatest environmental effect in the study area over the 2010 to 2035 planning period.

Based on the California DOF estimates (2010), which reported that these four counties recorded an average of 3.2 persons per dwelling unit and the preferred residential densities adopted in the San Joaquin Valley Blueprint (ranging from 5.3 units/acre in Tulare County to 8 units/acre in Fresno and Kern counties), it would take about 86,100 acres of land to accommodate future housing. However, this land consumption estimate does not take into account related commercial, transportation, and supporting infrastructure such as parks, water treatment, and medical facilities. With necessary supporting infrastructure, including commercial, office, transportation, parks, and schools, a typical density for an area similar to the San Joaquin Valley would result in 8 to 10 people per acre of land development³ (US 36 AADEIS, CDOT 2006). Under this scenario, the total four-county growth projections are for approximately 173,000 acres of land development. Additionally, this development is anticipated to follow current patterns dispersed along the edges of city growth boundaries and into unincorporated areas along highways.

Vehicle Miles Traveled (VMT)

A transportation planning term that measures the extent of motor vehicle operation. Specifically, it measures the total number of miles traveled by a vehicle in a specific area over a given period of time.

An increase in population and employment creates an increasing need to travel between destinations. The regional measure for growth in travel is the amount of VMT during a year's timeframe. Between 2010 and 2035, VMT is projected to increase by 16% in Fresno County and 67% in Kern County; during this time period, VMT is expected to decrease by 13% in Tulare County and 5% in Kings County. Based on estimates by Cambridge Systematics and Caltrans (2009), the four-county region is projected to increase from almost 62 million to 80 million miles traveled per day in 2035. This increase would require an estimated 796,000 gallons of petroleum per day in the Fresno to Bakersfield region alone (Bureau of Transportation Statistics 2010).

The conversion of vacant and agricultural land for development will affect and change the character of many of the environmental resources in the study area.

³ In Denver, the Colorado Department of Transportation studied the land use density as part of the preparation for the US 36 Project Alternative Analysis/EIS (2006). The study conducted a GIS analysis of 50 years of land use trends based on historical aerial photos digitized, and then measured actual census data to determine that the gross use of an acre of land supported an average of 10 persons.

Increasingly stringent federal and state emission control requirements and the replacement of older, higher-polluting vehicles with newer, less-polluting ones would reduce basin-wide air pollution emissions under the No Project Alternative and air quality would improve. Noise would stay at a similar level because local general plans and noise and vibration ordinances are in place to ensure that standards are met.

Future conditions from increased development would likely result in the additional use of electricity and radio frequency (RF) communications that would increase the generation of electromagnetic fields (EMFs) and electromagnetic interference (EMI) in the area. Demand for energy would also increase at a level commensurate with population growth under the No Project Alternative, which would require additional generation and transmission capacity. As stated above, daily VMT in Fresno, Kings, Tulare, and Kern counties would increase, requiring additional demand for petroleum.

Existing trends affecting biological resources are expected to continue or worsen, including habitat loss from development, mortality from vehicle strikes, habitat degradation from pollution (e.g., polluted runoff from stormwater, inadvertent spills of hazardous materials), and noise and dust from development. Effects of the current built environment on hydrology and water resources would continue, including effects from continued operation of existing highways, airports, and railways.

A consequence of the No Project Alternative would be that the project vicinity would not include the higher-density, transit-oriented development planned around proposed urban HST stations, and the continuation of low-density development might be more likely. This development pattern would increase impervious ground area and an associated increase in stormwater runoff in the urban fringe. Additionally, increases in traffic in Fresno and Kern counties would degrade water quality because of increased pollutants in stormwater from vehicles on roadways. Infrastructure and development projects could cause water or wind erosion, loss of valuable topsoil, and constraints on the potential for oil and gas resource development.

Current trends for accidents related to hazardous materials and wastes would continue with operation of commercial and industrial facilities or during transport of these goods. Under the No Project Alternative, safety and security in the study area would follow current trends. Increased vehicular traffic volumes in Fresno and Kern counties over the next 25 years would be expected to result in increased traffic accidents; however, with planned roadway improvements, it is expected that existing accident trends in the study area would continue into the future. Counties and cities have the financial mechanisms in place to meet service level goals for emergency responders with the population growth planned for the study area. For these reasons, no adverse or significant impact on accident prevention or emergency response are anticipated.

The No Project Alternative would not have the community benefits associated with the HST project: reduction of traffic congestion on highways and major roadways and improved mobility and access to jobs, educational opportunities, and recreational resources. To the extent the net increase in housing units and industrial space in the region occurs in incorporated cities, it would be consistent with adopted general plans and policies, which aim to strengthen socioeconomic conditions in existing communities and improve neighborhood amenities, potentially benefiting community cohesion. Emergency response times and access would likely be enhanced from transportation improvements but challenged by dispersed development. The planned projects comprising the No Project Alternative would require acquisition of land and may result in displacement of residences and/or businesses, resulting in some economic benefits as well as potential fiscal and employment losses as a result of relocations. Planned transportation improvements would be made to rail, highway, airport, and transit systems, and commercial and residential development projects would occur throughout the region, which as a whole has

substantial numbers of communities of concern. As a result, these planned projects may disproportionately affect minority and/or low-income populations.

As described above, the No Project Alternative would result in up to 173,000 acres of land for future housing and necessary supporting infrastructure. While some infill development could occur without the HST to act as a catalyst, little TOD development is likely to be attracted to the downtown areas of Fresno and Bakersfield with the No Project Alternative. As an example, newly planned residential development proposed in the four counties would primarily be located on currently undeveloped land. Isolated development and roadway transportation projects would not provide the same opportunities for redevelopment within the downtown areas of Fresno and Bakersfield as would the development of HST stations. Overall, the No Project Alternative would not be as strong a catalyst in supporting the development envisioned in these general plans and other planning documents as would the HST alternatives.

Growth would occur on agricultural lands under the No Project Alternative. The eight San Joaquin Valley counties that participated in the San Joaquin Valley Blueprint planning process developed a forecast of farmland conversion to nonagricultural uses by 2050 based on current development patterns. Given continuation of these patterns, 327,000 acres of farmland would be converted by 2050 (San Joaquin Valley Blueprint 2009). Because of the extent and quality of farmland in these counties, most of this growth is likely to occur on Important Farmlands⁴. Most development in the southern San Joaquin Valley that is currently being planned or permitted is located in the vicinity of urban centers and/or along SR 99. Most of this development would take place on currently unincorporated county land that is largely classified as Prime Farmland⁵. A total of approximately 5,100 acres of farmland would be converted to nonagricultural uses by development planned or permitted within 2 miles of the Fresno to Bakersfield Section alternatives by 2035.

The No Project Alternative would not cause or accelerate substantial physical deterioration of parks, recreation, and open space resources. Continuing the pattern of converting farmland to development, the No Project Alternative would increase the loss of rural views while resulting in limited improvement to the generally moderate to moderately low visual quality in proposed redevelopment areas.

Under the No Project Alternative, cultural resources will continue to be affected in the Central Valley urban areas through the development of land resulting from growth. Changes in land use, and ground disturbance associated with other transportation infrastructure improvements will occur with the expansion of existing highways to accommodate the state's growing population. Adverse effects on eligible resources could result in the loss of historic properties.

Fresno and Bakersfield land use plans encourage infill and higher-density development in urban areas and concentration of uses around transit corridors to provide more modal choices for residents and workers. The San Joaquin Valley Blueprint identifies the HST as a critical element in meeting the goal of increased urban densification, and the No Project Alternative would conflict with this goal. Under the No Project Alternative, cities would have a more difficult time reducing low-density sprawl and encouraging higher-density development, and fewer modal choices would be available.

Construction of planned development and transportation projects, including the expansion of SR 99, would generate short-term construction employment in the region and a small number of

⁴ Important Farmland is Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance identified by the California Department of Conservation.

⁵ Prime Farmland has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops when treated and managed, including water management, according to current farming methods.

long-term permanent jobs to maintain new and expanded facilities. Under the No Project Alternative, fewer business and employment opportunities would exist in comparison to the HST alternatives. Employment growth would continue to follow existing patterns and would attract fewer of the higher-wage jobs in the financial, insurance, and real estate sectors than would occur under the HST alternatives.

S.8 HST Alternatives Evaluation

The following section provides an overview of the effects, including benefits common to all HST alternatives and proposed mitigation, and compares differences between the impacts and costs of the six alternative alignments and the HMF alternatives. Table S-1 provides a high-level comparison of key design features associated with each of the alternative alignments being carried forward. This section then presents discussions of the impacts that differentiate the alternatives (and proposed mitigation measures) and the HMF alternatives (and proposed mitigation measures), as well as cost estimates for each alternative.

Table S-1
Design Features of Alternatives Carried Forward*

Design Option	BNSF Alternative	Alternatives to BNSF Alignment				
		Corcoran Elevated	Corcoran Bypass	Allensworth Bypass	Wasco-Shafter Bypass	Bakersfield South
Total length (linear miles)	114	4(4)	21(21)	19(19)	23(24)	9(9)
At-grade profile (linear miles)	91	0(4)	20(20)	17(16)	19(17)	2(2)
Elevated profile (linear miles) (including Retained Fill)	23	4(0)	1(1)	2(3)	4(7)	7(7)
Number of Straddle Bents	29	7(0)	4(0)	0(0)	4(0)	38(27)
Number of Railroad Crossings	9	8(1)	1(1)	1(1)	1(1)	3(2)
Number of Major Water Crossings	7	0(0)	2(2)	0(0)	1(1)	1(1)
Number of Road Crossings	124	6(5)	19(16)	8(8)	27(14)	6(2)
Number of Roadway Closures	37	1(2)	8(7)	2(2)	18(5)	4(1)
Number of Roadway Overcrossings and Undercrossings	55	0(4)	9(13)	4(6)	7(9)	1(1)
*Note: Equivalent numbers for the corresponding segment of the BNSF Alternative are presented in parenthesis.						

S.8.1 HST Benefits

Of the 8,400 daily riders who would board the HST at the Downtown Fresno Station in 2035, approximately 84% would have otherwise taken an automobile trip to their destination. Overall, the HST project would reduce daily VMT by 11% in Fresno County, 15% in Kings County, 5% in Tulare County, and 10% in Kern County, resulting in the benefits of decreased fuel consumption, decreased congestion, improved travel time, and reductions in air pollution emissions. The HST also would reduce the demand and substitute for commercial air travel within California.

Although the HST project would increase electricity consumption compared to the No Project Alternative, the HST project would reduce vehicle and air travel miles with corresponding reductions in fuel consumption and air emissions, for a substantial net reduction in emissions. In addition, the State of California requires that an increasing fraction (33% by 2020) of the electricity generated for the state's power portfolio come from renewable energy sources. As such, the emissions generated for powering the HST system are expected to be lower in the future than the estimates included in this EIR/EIS. The Authority has adopted a policy goal to purchase all HST system power from renewable energy sources, which would result in a greater overall reduction in emissions from the HST project.

The HST stations would have the benefit of encouraging high-density, transit-oriented development in Fresno and Bakersfield and would attract development away from the edges of urban boundaries (also called sprawl) in these cities. The Authority would work with the city of Hanford and Kings County to develop plans to protect land from urban development round the Kings/Tulare Regional Station, including acquisition of agricultural conservation easements in the station vicinity and limiting parking at the station to promote the use of transit between the station and local communities. The HST project could improve water quality in Fresno and Kern counties compared to the No Project Alternative because of decreased VMT and the encouragement of transit-oriented development, which in turn would reduce non-point source pollutants through trip reduction and increased density. The HST project may induce slight population and employment growth throughout the region, including in the communities that would not have an HST station. Indirect impacts would increase employment opportunities and economic vitality throughout the region, a result not likely under the No Project Alternative. Under current city and county general plans, communities in the region have adopted urban growth boundaries to accommodate growth beyond the 2035 planning horizon, including any growth induced by the HST project. HST-induced growth would, therefore, not require farmland conversion beyond what is planned for conversion. Generally, low-income and minority populations reside throughout the Fresno-to-Bakersfield corridor; therefore, benefits such as improved mobility, air quality, and employment would accrue to these low-income and minority populations because they compose such a large percentage in the region.

The analysis of all HST alternatives determined that by applying required federal and state regulations and engineering criteria standards, the operation of the project would not have substantial effects on public utilities and energy; land use; geology, soils, and seismicity; hazardous materials and wastes; hydrology and water resources; station planning, land use, and development; and regional growth.

S.8.2 Adverse Effects Common to All HST Alternatives

The following potentially significant impacts would occur with all HST alternatives. Note that some impact numbers and mitigation measure numbers correspond to impacts and mitigation measures listed in Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures, organized by resource.

- **Transportation:** The project would grade-separate many existing at-grade crossings of the BNSF Railway between Fresno and Bakersfield, benefiting traffic safety and circulation. Project operation would increase traffic congestion at numerous intersections around the Fresno, Bakersfield, and Kings/Tulare Regional stations. Mitigation measures for operational impacts include a wide variety of roadway improvements including restriping, installation of signals, modification of signal timing, and roadway widening. Following mitigation, traffic impacts at all intersections except for the H Street intersections at Tulare and Divisadero in Fresno would be negligible under NEPA and less than significant under CEQA. Traffic congestion would continue to be substantial under NEPA and significant under CEQA at the two intersections in Fresno because adjacent development makes improvements to these intersections not practicable.
- **Air Quality:** The San Joaquin Valley does not meet National Ambient Air Quality Standards (NAAQS) or California Ambient Air Quality Standards (CAAQS) for ozone and particulate matter (particles) less than 2.5 micrometers (PM_{2.5}), and does not meet CAAQS for particulate matter (particles) between 2.5 and 10 micrometers (PM₁₀). Fresno and Bakersfield are under EPA-approved plans to maintain carbon monoxide (CO) concentrations at or below current levels. Project construction for all HST alternatives would result in substantial emissions of ozone precursors (volatile organic compounds [VOCs] and nitrogen oxides [NO_x]), PM₁₀, PM_{2.5}, and CO. Project construction for all HST alternatives would also conflict with regional attainment plans and exceed CEQA significance thresholds for VOCs and NO_x, PM₁₀, and PM_{2.5}.

Hauling materials needed for track construction could violate air quality standards for NO_x in some air basins outside the San Joaquin Valley. This would be mitigated by reducing emissions from on-road construction equipment, and purchasing emissions offsets if necessary, but in some air basins this impact could remain substantial under NEPA and significant under CEQA.

Construction also may expose residences, preschools, schools, daycare centers, and hospitals (sensitive receptors) to substantial pollutant concentrations resulting from concrete batch plant operations. Construction impacts would be temporary and mitigation of construction impacts would include standard best management practices (BMPs) during construction, reducing fugitive dust during material hauling, reducing criteria exhaust emissions from construction and on-road equipment, reducing VOC emissions from paint, and reducing the potential impact of concrete batch plants. Because of the large volume of emissions associated with project construction, air quality effects would remain substantial under NEPA and the impacts would be significant under CEQA following mitigation.

Project operations for all HST alternatives would result in a net benefit to air quality because the HST project would result in lower mobile source air toxics (MSATs), greenhouse gases (GHG), VOC, NO_x, CO, PM₁₀, and PM_{2.5} emissions compared to the No Project Alternative. Operation of the HMF at either the Fresno or Wasco sites (Figure S-2) could expose sensitive receptors to substantial toxic air contaminant concentrations. Mitigation of this operational impact includes locating emission sources within the HMF property away from possible sensitive receptors and using best industry practices or alternative equipment to reduce emissions. The air quality effect of HMF emissions at the Fresno and Wasco sites would continue to be substantial under NEPA and the impact would be significant under CEQA following mitigation.

- **Noise and Vibration:** All HST alternatives would create noise impacts during construction. Mitigation for these impacts includes noise monitoring during construction and requiring the contractor to implement one or more noise control measures to meet noise limits.

Construction noise effects would be negligible under NEPA and the impacts would be less than significant under CEQA following mitigation.

Building damage from construction vibration is only anticipated from impact pile driving very close to buildings. Damage from construction vibration is not anticipated if pile driving takes place more than 25 to 50 feet from buildings, or if alternative methods such as push driving or auger installation can be used. Mitigation includes preconstruction surveys to document the existing condition of buildings located within 50 feet of pile installation and using methods other than a hammer to install piles close to buildings that could be damaged by vibration. This mitigation would make construction vibration effects negligible under NEPA and impacts less than significant under CEQA.

All HST alternatives would create operational noise and vibration impacts. Mitigation for noise includes noise barriers, building insulation, special track work at crossovers and turnouts, and vehicle noise specifications. For vibration impacts, mitigation measures include trenches, building modification, and buffer zones. At some locations operational noise and vibration effects could continue to be substantial under NEPA and significant under CEQA following mitigation.

- **EMF/EMI:** Under all HST alternatives, HST workers with implanted medical devices would be adversely affected by exposure to EMF at electrical facilities, such as traction power facilities. Impacts to workers with implanted medical devices would be mitigated by implementing a safety program that would educate such workers to EMF hazards and exclude them from entering any facility with electrical equipment that could endanger them. This mitigation would make EMF effects to workers negligible under NEPA and the impact would be less than significant under CEQA. The Bakersfield South Alternative could cause electromagnetic interference with medical equipment at Mercy Hospital in Bakersfield. This impact would be mitigated through design provisions to prevent interference, such as establishing RF-resistant walls around sensitive equipment or installing RF filters in sensitive equipment. This would make the EMI effect negligible under NEPA and the impact would be less than significant under CEQA.
- **Biological Resources:** Construction of the HST alternatives could introduce noxious weeds; could disturb plant species that are rare or protected under state and/or federal law (special-status species), breeding birds, wildlife, and habitat with potential for supporting special-status wildlife species; convert substantial acreage of native habitat including annual grasslands, alkali desert scrub, and riparian areas; reduce the functionality of wildlife corridors and linkages; and disturb trees protected by local ordinances. Operation of the project would permanently impact suitable habitat for special-status plant and animal species; permanently impact sensitive plant communities and jurisdictional waters; impact critical habitat of vernal pool fairy shrimp (branchiopods); impact U.S. Fish and Wildlife Service (USFWS) recovery plans for threatened or endangered species; impact the Allensworth Ecological Reserve; remove protected trees; and reduce the functionality of wildlife movement corridors and linkages.

Construction and project period common mitigation measures that avoid and or minimize impacts on all biological resources and wetlands include monitoring, worker awareness training, weed control, implementing a biological resources management plan, implementing a restoration and revegetation plan, identification of environmentally sensitive areas and environmentally restricted areas, installation and use of approved fencing, and compliance reporting. Construction period mitigation measures to avoid or minimize impacts on biological resources include mapping special-status plants species and communities to avoid, protocol and/or preconstruction surveys of special-status wildlife species, construction timing, and implementation of resource specific guidelines and/or restoration of habitats and monitoring.

Mitigation for impacts during project operation include coordinating with the regulatory agencies (i.e., USFWS, U.S Army Corps of Engineers [USACE], California Department of Fish and Game [CDFG]); compensating for impacts on special-status plant species and plant communities; compensating for impacts on special-status wildlife species; implementing agency-approved guidelines and a habitat mitigation and monitoring plan; compensating for impacts on jurisdictional waters; compensating for the loss of protected trees; and providing and monitoring wildlife crossing restoration. Following mitigation, the project-related reduction in the functionality of wildlife movement corridors and habitat linkages would remain substantial under NEPA and a significant impact under CEQA.

- **Safety and Security:** All HST alternatives could increase demand for local emergency responders around the stations due to station activity and associated redevelopment and economic activity. This could increase response times and require new or physically altered government facilities that might impact the environment. This is a potentially moderate impact under NEPA and a significant impact under CEQA. As mitigation, emergency response to station and HMF incidents would be monitored, and if determined that the HST project does result in increased demand, a fair share impact fee to local service providers would be negotiated, reducing effects to negligible under NEPA and less than significant under CEQA.

The Corcoran Bypass Alternative would affect a private airstrip. This impact would be mitigated by compensating the owner for the loss of the airstrip, resulting in a negligible effect under NEPA and a less than significant impact under CEQA.

- **Socioeconomics, Communities, and Environmental Justice:** All HST alternatives would result in the division of existing communities east of Hanford and in northeast Bakersfield. All alternatives would result in displacement impacts of community facilities. Mitigation measures include coordination with the respective parties before land acquisition to assess potential opportunities to reconfigure land use and buildings and/or relocate affected facilities, as necessary, to minimize disruption of facility activities. Following mitigation, the effect of community division would remain substantial under NEPA.
- **Agricultural Lands:** Construction and operation of all alternatives would result in permanent conversion of agricultural land to nonagricultural use. Mitigation of this impact includes preservation of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland and creation of a farmland consolidation program to sell non-economic remnant parcels to neighboring landowners. Because farmland cannot be replaced, the effect would remain substantial under NEPA and the impact would be significant under CEQA following mitigation.
- **Parks, Recreation, and Open Space:** Operation of all HST alternatives would affect the Amtrak playground in Bakersfield. Mitigation of construction impacts includes compensation for park use during construction. Mitigation of operation impacts includes financial compensation for purchase and development of replacement property and increased maintenance requirements. Following mitigation, construction and operation effects on the Amtrak playground would be negligible under NEPA and less than significant under CEQA.
- **Visual and Aesthetic Resources:** All HST alternatives would cause visual disturbance during construction including new sources of light and glare, and visual nuisance. All HST facilities, including sound barriers, would affect visual quality throughout the length of the project. Mitigation measures to reduce these impacts include minimizing clearing, preserving existing vegetation, using screens where possible, incorporating design criteria for elevated and station elements to adapt to local context, planting trees along edges of the right-of-way adjacent to residential areas, installing landscape treatments along HST overcrossings and retained fill elements, designing noise barriers in consideration of visual quality, and

screening of traction power system facilities. Following mitigation, views would continue to be blocked by some sound barriers and visual quality would be reduced in Bakersfield by HST elevated structures. These effects would continue to be substantial under NEPA and significant impacts under CEQA.

- **Cultural and Paleontological Resources:** All HST alternatives have the potential to cause impacts on historic properties (Section 106) and historic resources (CEQA) representing both archaeological and architectural resources, and areas of high paleontological sensitivity. HST alternatives would affect historically significant architectural resources. Mitigation for these impacts includes implementing a resource treatment plan for prehistoric and historic resources developed in coordination with the California State Historic Preservation Officer as well as complying with the mitigation framework outlined in the Section 106 Programmatic Agreement for cultural resources protection that has been developed for this project. For paleontological resources, the mitigation includes implementing a paleontological resources monitoring and mitigation plan, and halting construction if paleontological resources are found until they can be evaluated and recorded, as appropriate. Following mitigation, effects to some historic properties would remain substantial under NEPA and the impact would be significant under CEQA.

S.8.3 Comparison of HST Alignment Alternatives

The BNSF Alternative is a single continuous alignment from Fresno to Bakersfield. The additional five alternative alignments considered in this EIR/EIS deviate from the BNSF Alternative for portions of the route. There are 24 possible combinations of these alternatives to make a continuous alignment from Fresno to Bakersfield.

Table S-2 at the end of the summary lists those impacts that differentiate each of the 24 project alignment alternatives. There are other environmental impacts associated with the alignment alternatives that are not listed in Table S-2 because they are of similar magnitude among the alternatives and therefore do not provide a means of differentiating between alternatives. Table S-3 at the end of the summary lists all substantial and significant project impacts.

Many regulations require standard measures to avoid and minimize environmental impacts. The Authority will comply with these regulations, and therefore these measures are not summarized here. Table S-3 at the end of the summary presents all of the mitigation measures proposed for the project. In addition, the Authority will strive to avoid and minimize impacts further as design progresses.

The five base alternatives that deviate from the BNSF Alternative were developed to reduce environmental impacts of the HST project. The principal benefits and impacts of these alternatives relative to the BNSF Alternative follow.

The Corcoran Elevated Alternative would have impacts similar to those of the corresponding segment of the BNSF Alternative, since both of these alignments follow the same general corridor through the city of Corcoran. The Corcoran Elevated Alternative would result in fewer residential and business displacements than the BNSF Alternative, and would be less disruptive of the roadway network in Corcoran. The Corcoran Elevated Alternative would result in noise impacts on more sensitive receptors such as residences and schools than the BNSF Alternative, and would have a greater visual impact to residents of the community than the BNSF Alternative.

The Corcoran Bypass Alternative avoids the city of Corcoran, deviating from the BNSF Railway. The Corcoran Bypass Alternative would have fewer noise impacts on sensitive receptors, affect fewer low-income and minority communities, cause less community disruption, and result in fewer business displacements than the BNSF Alternative. The Corcoran Bypass Alternative would

result in a smaller loss in property tax revenues, a greater loss in agricultural sales, conversion of more agricultural land to nonagricultural uses, and a greater loss of land protected under the Williamson Act than the BNSF Alternative.

The BNSF Alternative would require the acquisition of property from Allensworth State Historic Park and the Allensworth Ecological Reserve. This alternative would also cause visual and noise impacts on the park. The Allensworth Bypass Alternative would avoid these impacts and reduce the acreage of jurisdictional waters permanently affected by the project. However, the Allensworth Bypass Alternative would have a greater property tax revenue reduction, cause more agricultural business impacts, convert more acres of farmland to nonagricultural uses, and affect more acres of Williamson Act land than the BNSF Alternative.

The Wasco-Shafter Bypass Alternative avoids the communities of Wasco and Shafter, while the BNSF Alternative goes through these communities adjacent to the BNSF Railway. The Wasco-Shafter Bypass Alternative would have fewer noise impacts, affect fewer acres of waters of the United States, affect fewer low-income and minority communities, cause less community disruption, and result in fewer residential and business displacements than the BNSF Alternative. The Wasco-Shafter Bypass Alternative would result in a greater loss in agricultural sales, more conversion of agricultural land to nonagricultural uses, and a greater loss of land protected under the Williamson Act than the BNSF Alternative.

The Bakersfield South Alternative would also have impacts similar to those of the corresponding segment of the BNSF Alternative, since these two alternatives are only several hundred feet apart as they cross through metropolitan Bakersfield. Noise associated with the HST on the Bakersfield South Alternative would affect more sensitive receptors than the corresponding segment of the BNSF Alternative. The Bakersfield South Alternative would have EMI impacts on medical equipment in Mercy Hospital. Unlike the BNSF Alternative, the Bakersfield South Alternative would not encroach on the campus of Bakersfield High School. The Bakersfield South Alternative would have fewer residential and business relocations and have a smaller property and sales tax revenue reduction than the corresponding section of the BNSF Alternative. A greater number of religious facilities would be displaced with the Bakersfield South Alternative than the BNSF Alternative. The Bakersfield South Alternative would cross through the Mill Creek Redevelopment Area between the Amtrak Station and California Avenue. The BNSF Alternative would be located north of this redevelopment area.

S.8.4 Comparison of HMF Alternative Sites

As indicated above, five alternative sites were evaluated for an HMF facility along the Fresno to Bakersfield Section. Table S-4 at the end of the summary provides a comparison of impacts among these five sites.

S.8.5 Capital Cost

Table S-2 at the end of the summary provides a cost estimate in 2010 dollars for each of the 24 alignment alternatives. All of these estimates use the Fresno Mariposa Street Station Alternative. Although the estimated cost for the Fresno station at Mariposa Street and Kern Street would be the same, construction of the station at Kern Street would be \$27 million more than a station at Fresno Street because of increased track, site work, electric traction work, and design costs.

The HMF sites would all contain the same facilities to provide maintenance services for the HST system. The HMF at any of the sites would cost about \$620 million, based on conceptual site and functional layouts for the facilities.

S.9 Section 4(f)/Section 6(f)

S.9.1 Section 4(f)

Under Section 4(f) of 49 United States Code (U.S.C.) 303, an operating agency of the U.S. Department of Transportation may not approve a project that uses properties protected under this section of the law unless there are no prudent or feasible alternatives and the project includes all possible planning to minimize harm to such properties. Properties protected under Section 4(f) are publicly owned lands of a park, recreation area, or wildlife and waterfowl refuge or land of a historical site of national, state, or local significance as determined by the federal, state, regional, or local officials having jurisdiction over the resource.

There are 12 publicly-owned public parks, the Allensworth Ecological Reserve, and 25 historic properties in the vicinity of project alternatives that qualify for protection under Section 4(f). All of the alternatives would cross four irrigation canals that are on the National Register of Historic Places (NRHP) or eligible for the NRHP: the Washington Colony Canal and North Branch of Oleander Canal in Fresno County, the Peoples Ditch in Kings County, and the Friant-Kern Canal in Kern County. Because these canals are oriented in an east-west direction and the HST alternatives are oriented north-south, it is not possible to avoid these canals without substantial out-of-direct travel that would prevent the HST from operating within mandated travel times.

The BNSF Alternative would have direct use of two properties protected under Section 4(f): the Colonel Allensworth State Historic Park and the Allensworth Ecological Reserve. The BNSF Alternative would use 1.7 acres of the Allensworth State Historic Park and 7.3 acres of the Allensworth Ecological Reserve. Section 4(f) uses of the parks would be avoided with implementation of the Allensworth Bypass Alternative.

S.9.2 Section 6(f)

Section 6(f) properties are recreation resources funded by the Land and Water Conservation Fund (LWCF) Act. These properties also cannot be used for transportation project unless there is no prudent or feasible alternative, and their use must be fully mitigated to the satisfaction of the National Park Service and the local jurisdiction administering the recreation resource. Funds from a 1994 LWCF development grant to the California Department of Parks and Recreation were used for new recreational facilities at Colonel Allensworth State Historic Park/Allensworth Historic District. Therefore, this park is considered a 6(f) property. As indicated above, the BNSF Alternative Alignment would require conversion of approximately 1.7 acres of the park. Section 6(f) impacts on the park would be avoided with implementation of the Allensworth Bypass Alternative.

S.10 Areas of Controversy

Based on the scoping meetings and public outreach efforts throughout the environmental review process, the following are known areas of controversy:

- Selection of the preferred HST alternative.
- Impacts on special-status plants and wildlife and wildlife habitat preserves.
- Impacts on corridor communities (including noise, visual quality impacts, loss of community character and cohesion, and right-of-way acquisition).

- Impacts on farmlands (including severance of farmlands, loss of productive farmland, and loss of agricultural enterprises).
- Trade-offs between corridor communities and agricultural lands.

S.11 Next Steps in the Environmental Process

The Authority and FRA are circulating the Draft EIR/EIS to affected local jurisdictions, state and federal agencies, tribes, community organizations, other interest groups, interested individuals, and the public. The document also is available at the Authority offices, public libraries in the study area, and on the Authority's website. The following discussion outlines the next steps in the environmental process, from public and agency comment on the Draft EIR/EIS to construction and operation.

S.11.1 Public and Agency Comment

The Draft EIR/EIS will be circulated for a 45-day comment period, which will include public hearings. Information about the schedule of public hearings is available on the Authority's website at www.cahighspeedrail.ca.gov.

S.11.2 Identification of Preferred Alternative

After considering public and agency comments, the Authority and FRA will identify a preferred alignment alternative, site for each station, and a preferred HMF facility alternative from among the HMF alternatives. The Authority and FRA will prepare a Fresno to Bakersfield Section Final EIR/EIS that will include responses to comments and a description of the preferred alternative and proposed mitigation.

A. FRA DECISION-MAKING

Upon completion of the environmental process with publication of the Fresno to Bakersfield Section Final EIR/EIS, the FRA expects to issue a Record of Decision (ROD) for compliance with NEPA. The ROD will describe the project and alternatives considered, describe the selected alternative; make environmental findings and determinations with regard to air quality conformity, Endangered Species Act, Section 106, Section 4(f), and environmental justice; and require mitigation measures. Issuance of the ROD is a prerequisite for any federal funding or approvals.

B. U.S. ARMY CORPS OF ENGINEERS DECISION-MAKING

The Fresno to Bakersfield Section of the HST system will require a permit from the USACE under Section 404 of the Clean Water Act and Section 14 of the Rivers and Harbors Act (33 U.S.C. 408). The USACE is using the Fresno to Bakersfield Section EIR/EIS to integrate the procedural and substantive requirements of NEPA and its permitting responsibilities (including EPA's 404(b)(1) Guidelines) to provide a single document that streamlines and enables informed decision-making by the USACE, including but not limited to, adoption of the EIS, issuance of necessary RODs, Section 404 permit decisions, and Section 408 permit decisions (as applicable) for alteration/modification of completed federal flood risk management facilities and any associated operation and maintenance, and real estate permissions or instruments (as applicable).

C. CALIFORNIA HIGH-SPEED RAIL AUTHORITY DECISION-MAKING

After completion of the environmental process, the Authority will consider whether to certify the Final EIR/EIS for compliance with CEQA. Once the Authority certifies the Final EIR/EIS, it can approve the project and make related CEQA decisions (findings, mitigation plan, and potential

statement of overriding considerations). The required CEQA findings prepared for each significant effect will be one of the following:

- Changes or alternatives have been required or incorporated into the project that avoid or substantially lessen the significant environmental effect as identified in the Final EIR.
- Changes or alternatives are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency.
- Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or HST alternatives identified in the Final EIR.

If the Authority proceeds with approval of the project, the Authority would file a Notice of Determination (NOD) that describes the project and whether the project will have a significant effect on the environment. If the Authority approves a project that will result in the occurrence of significant effects identified in the Final EIR but not avoided or substantially lessened, CEQA requires the preparation of a Statement of Overriding Considerations which provides specific reasons to support the project, including economic, legal, social, technological, or other benefits of the proposed project that outweigh unavoidable adverse environmental effects. If such a statement is prepared, the Authority's NOD will reference the statement.

For purposes of this Fresno to Bakersfield Section EIR/EIS, project approval would include selection of a north/south alignment alternative and selection of station locations. The Authority anticipates identifying a preferred HMF facility site from among the HMF alternative sites examined in this document. The Authority is also considering HMF facility alternative sites as part of the Merced to Fresno Section EIR/EIS, and anticipates identifying a preferred HMF facility site from among the alternatives in that EIR/EIS. A final decision on the HMF facility location is anticipated to occur at a date later than the decisions on the north/south alignments and stations, and based on the Authority's consideration of the preferred HMF alternative sites from both the Fresno to Bakersfield and Merced to Fresno sections.

D. PROJECT IMPLEMENTATION

After the issuance of the FRA's ROD and the Authority's NOD, the Authority would complete final design, obtain construction permits, and acquire property prior to construction, as shown in Figure S-3.

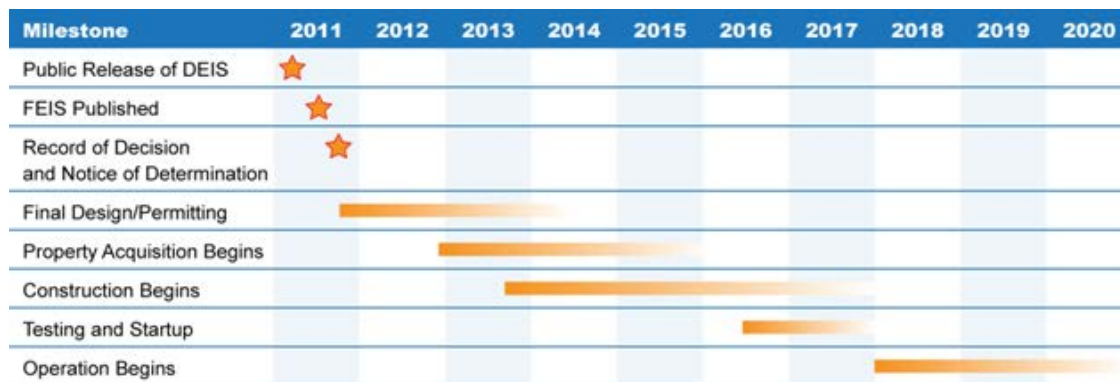


Figure S-3
Next steps scheduled

Table S-2
Comparison of Impacts of HST Alignment Alternatives

Impact	HST Alternatives (See footnote at end of table for numbered alternative descriptions)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Project Costs																								
Project costs (not including HMF) by alternative Base Year FY 2010 Dollars (millions)	\$7,011	\$7,187	\$6,856	\$6,804	\$6,643	\$6,950	\$6,980	\$6,819	\$7,126	\$6,581	\$6,919	\$6,520	\$6,758	\$6,649	\$6,488	\$6,795	\$6,250	\$6,588	\$6,189	\$6,427	\$6,405	\$6,743	\$6,344	\$6,582
Transportation and Traffic																								
Construction Impacts - There are no significant differentiating construction impacts between alternatives for transportation and traffic.																								
Project Impacts																								
TR #1: Total number of permanent road closures.	37	36	38	37	50	41	36	49	40	49	40	53	53	38	51	42	51	42	55	55	50	41	54	54
Noise and Vibration																								
Construction Impacts - There are no significant differentiating construction impacts between alternatives for noise and vibration.																								
Project Impacts																								
N&V #3: Number of severe operational noise impacts to sensitive receivers.	5,513	5,714	5,206	5,482	3,858	5,513	5,683	4,059	5,714	4,028	5,683	4,028	4,059	5,175	3,551	5,206	3,520	5,175	3,520	3,551	3,827	5,482	3,827	3,858
N&V #4: Number of operational vibration impacts to sensitive receivers.	39	28	48	47	36	39	26	25	28	23	26	23	25	46	45	48	43	46	43	45	34	37	34	36
Electromagnetic Fields and Electromagnetic Interference																								
Construction Impacts - There are no significant differentiating construction impacts between alternatives for electromagnetic field and electromagnetic interference.																								
Project Impacts																								
EMF/EMI #2: Impacts to sensitive medical devices or imaging equipment.	No	No	No	No	No	Yes	No	No	Yes	No	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Public Utilities and Energy																								
Construction Impacts - There are no significant differentiating construction impacts between alternatives for public utilities and energy.																								
Project Impacts - There are no significant differentiating project impacts between alternatives for public utilities and energy.																								
Biological Resources and Wetlands																								
Construction Impacts																								
Special-Status Plants																								
BIO #1: Number of acres temporarily impacted that has potential to support special-status plant species.	29	32	32	49	32	30	52	34	32	54	52	55	35	52	34	32	54	52	55	35	52	50	52	32
Special-Status Wildlife Species																								
BIO #2 through BIO #6: Number of acres temporarily impacted that has potential to support special-status wildlife species.	1,967	1,979	1,973	1,964	1,918	1,969	1,974	1,928	1,979	1,923	1,974	1,924	1,928	1,969	1,922	1,973	1,918	1,969	1,918	1,923	1,913	1,965	1,914	1,918
Special-Status Plant Communities																								
BIO #7: Number of acres temporarily disturbed that supports special-status plant communities and riparian areas.	30	32	32	49	32	30	52	35	32	54	52	54	35	52	35	33	54	52	55	35	52	50	52	33
Jurisdictional Waters																								
BIO #8: Number of acres directly and indirectly temporarily impacted that contain jurisdictional waters.	8.06	8.10	9.24	9.89	7.77	8.84	9.93	7.81	8.88	9.64	10.71	10.42	8.59	11.07	8.95	10.02	10.78	11.85	11.56	9.73	9.60	10.67	10.38	8.55

Table S-2
Comparison of Impacts of HST Alignment Alternatives

Impact	HST Alternatives (See footnote at end of table for numbered alternative descriptions)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Conservation Areas																								
BIO #10: Number of acres temporarily impacted that are located in USFWS recovery plans.	422	422	430	562	425	427	562	425	427	565	567	570	430	567	433	435	573	575	578	438	565	567	570	430
Project Impacts																								
Special-Status Plant Species																								
BIO #15: Number of acres impacted that has potential to support special-status plant species.	114	112	134	187	114	114	185	113	113	186	186	187	114	207	135	135	208	208	209	136	188	187	188	115
Special-Status Wildlife Species																								
BIO #16 through BIO #20: Number of acres impacted that has potential to support special-status wildlife species.	2,851	2,796	2,780	2,886	2,860	2,781	2,830	2,804	2,726	2,839	2,760	2,769	2,734	2,815	2,789	2,710	2,823	2,745	2,753	2,719	2,894	2,815	2,824	2,790
Special-Status Plant Communities																								
BIO #21: Number of acres disturbed that supports special-status plant communities and riparian areas.	129	127	150	199	130	127	198	128	126	199	196	197	126	220	150	148	221	218	219	149	200	197	198	128
Jurisdictional Waters																								
BIO #22: Number of acres directly and indirectly impacted that contain jurisdictional waters	60.94	59.32	52.17	57.64	60.27	60.51	56.02	58.65	58.89	55.35	55.59	54.92	58.22	48.87	51.50	51.74	48.20	48.44	47.77	51.07	56.97	57.21	56.54	59.84
Conservation Areas																								
BIO #24: Number of acres that would disturb portions of recovery plans.	705	705	606	742	720	639	742	720	638	757	675	690	653	643	620	539	658	576	591	553	757	676	690	653
BIO #25: Number of acres that would disturb portions of the Allensworth Ecological Reserve.	8	8	8	0	8	8	0	8	8	0	0	0	8	0	8	8	0	0	0	8	0	0	0	8
Hydrology and Water Resources																								
Construction Impacts - There are no significant differentiating construction impacts between alternatives for hydrology and water quality.																								
Project Impacts - There are no significant differentiating project impacts between alternatives for hydrology and water quality.																								
Geology, Soils, and Seismicity																								
Construction Impacts - There are no significant differentiating construction impacts between alternatives for geology and soils.																								
Project Impacts - There are no significant differentiating project impacts between alternatives for geology and soils.																								
Hazardous Materials and Wastes																								
Construction Impacts - There are no significant differentiating construction impacts between alternatives for Hazardous Materials and Wastes.																								
Project Impacts - There are no significant differentiating project impacts between alternatives for Hazardous Materials and Wastes.																								

Table S-2
Comparison of Impacts of HST Alignment Alternatives

Impact	HST Alternatives (See footnote at end of table for numbered alternative descriptions)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Safety and Security																								
Construction Impacts - There are no significant differentiating construction impacts between alternatives for safety and security.																								
Project Impacts																								
S&S #1: Proximity of a private airstrip to HST facilities	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Socioeconomics, Communities, and Environmental Justice																								
Construction Impacts - There are no significant differentiating construction impacts between alternatives for socioeconomics, communities, and environmental justice.																								
Project Impacts																								
SO #4: Displacement of Bakersfield High School's Industrial Arts building.	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No	Yes	Yes	No	Yes	No	No	No	Yes	No	No	No
SO #5: Displacement of the Mercado Latino Tianguis.	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No	Yes	Yes	No	Yes	No	No	No	Yes	No	No	No
SO #7: Displacement of Mercy Hospital medical complex facilities.	No	No	No	No	No	Yes	No	No	Yes	No	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
SO #8: Displacement of religious facilities.	7	6	8	7	7	9	6	6	8	6	8	8	8	8	8	10	8	10	10	10	7	9	9	9
Estimated number of housing units displaced in EJ areas	192	142	131	187	184	173	137	134	123	129	118	110	115	126	123	112	118	107	99	104	179	168	160	165
Station Planning, Land Use, and Development																								
Construction Impacts - There are no significant differentiating construction impacts between alternatives for station planning, land use, and development.																								
Project Impacts - There are no significant differentiating project impacts between alternatives for station planning, land use, and development.																								
Agricultural Lands																								
Construction Impacts - There are no significant differentiating construction impacts between alternatives for agricultural lands.																								
Project Impacts																								
AG #1: Number of acres of agricultural land converted to nonagricultural use.	2,192	2,192	2,201	2,263	2,317	2,192	2,263	2,317	2,192	2,388	2,263	2,388	2,317	2,272	2,326	2,201	2,397	2,272	2,397	2,326	2,388	2,263	2,388	2,317
AG #2: Number of acres of agricultural parcels split creating parcels too small to economically farm.	108	108	112	132	182	108	132	182	108	206	132	206	182	136	186	112	210	136	210	186	206	132	206	182
Parks, Recreation, and Open Space																								
Construction Impacts																								
PK #1: Activities would create noise to some areas of Father Wyatt Park.	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
PK #3: Activities would create noise to some areas of Bakersfield High School.	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No	Yes	Yes	No	Yes	No	No	No	Yes	No	No	No
Project Impacts																								
PK#4: Required acquisition of Allensworth State Historic Park land.	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	No	No	Yes	No	Yes	Yes	No	No	No	Yes	No	No	No	Yes
PK#5: Required acquisition of Allensworth Ecological Reserve land.	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	No	No	Yes	No	Yes	Yes	No	No	No	Yes	No	No	No	Yes
PK#6: Addition of a modern feature not consistent with the historic atmosphere of Allensworth State Historic Park.	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	No	No	Yes	No	Yes	Yes	No	No	No	Yes	No	No	No	Yes

Table S-2
Comparison of Impacts of HST Alignment Alternatives

Impact	HST Alternatives (See footnote at end of table for numbered alternative descriptions)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Aesthetics and Visual Quality																								
Construction Impacts - There are no significant differentiating construction impacts between alternatives for agricultural lands.																								
Project Impacts																								
VQ #5: Lower visual quality in Corcoran, Wasco, Shafter, and Allensworth State Historic Park Landscape Units.	Yes	Yes	Yes	No	No	Yes	No	No	Yes	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No
Cultural and Paleontological Resources																								
Construction Impacts																								
Impact CUL #1: Effect on significant prehistoric and historic-era archaeological resources.	3	3	3	4	3	3	4	3	3	4	4	4	3	4	3	3	4	4	4	3	4	4	4	3
CUL #2: Effect on historically significant built- environment resources.	27	27	27	28	25	24	28	25	24	26	25	23	22	28	25	24	26	25	23	22	26	25	23	22
Project Impacts - There are no significant differentiating project impacts between alternatives for cultural and paleontological resources.																								
Regional Growth																								
Construction Impacts - There are no significant differentiating construction impacts between alternatives for regional growth.																								
Project Impacts - There are no significant differentiating project impacts between alternatives for regional growth.																								
Cumulative Impacts																								
Construction Impacts - There are no significant differentiating construction impacts between alternatives for cumulative impacts.																								
Project Impacts - There are no significant differentiating project impacts between alternatives for cumulative impacts.																								
Footnote: Each alternative combination was given a different number. Listed below is every single possible combination that may occur from the proposed alignment and alternatives. If an alternative alignment is not mentioned than the BNSF alternative is being used. 1. BNSF only 2. Corcoran Elevated 3. Corcoran Bypass 4. Allensworth Bypass 5. Wasco Shafter Bypass 6. Bakersfield South 7. Corcoran Elevated and Allensworth Bypass 8. Corcoran Elevated and Wasco Shafter Bypass 9. Corcoran Elevated and Bakersfield South 10. Corcoran Elevated and Allensworth Bypass and Wasco Shafter Bypass 11. Corcoran Elevated and Allensworth Bypass and Bakersfield South 12. Corcoran Elevated and Allensworth Bypass and Wasco Shafter Bypass and Bakersfield South 13. Corcoran Elevated and Wasco Shafter Bypass and Bakersfield South 14. Corcoran Bypass and Allensworth Bypass 15. Corcoran Bypass and Wasco Shafter Bypass 16. Corcoran Bypass and Bakersfield South 17. Corcoran Bypass and Allensworth Bypass and Wasco Shafter Bypass 18. Corcoran Bypass and Allensworth Bypass and Bakersfield South 19. Corcoran Bypass and Allensworth Bypass and Wasco Shafter Bypass and Bakersfield South 20. Corcoran Bypass and Wasco Shafter Bypass and Bakersfield South 21. Allensworth Bypass and Wasco Shafter Bypass 22. Allensworth Bypass and Bakersfield South 23. Allensworth Bypass and Wasco Shafter Bypass and Bakersfield South 24. Wasco Shafter Bypass and Bakersfield South																								

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Transportation and Traffic		
Construction Impacts		
There are no construction impacts for transportation and traffic.	Transportation and traffic avoidance and minimization measures 1 through 10.	N/A
Project Impacts		
TR #1: Permanent road closures.	TR-MM #1: Access maintenance for property owners.	Less than Significant
TR #2: HST station area roadway impacts.	TR-MM #7: Add New Lanes to roadway.	Less Than Significant
TR #2: HST station area intersection impacts.	TR-MM #2, TR-MM #3, TR-MM #4, TR-MM #5, TR-MM #6 These mitigation measures propose to improve intersections, traffic lights and lane movement.	Less Than Significant/Significant
TR #3: HMF site roadway impacts.	TR-MM #7: Add New Lanes to roadway.	Less Than Significant
TR #3: HMF site intersection impacts.	TR-MM #2, TR-MM #3, TR-MM #4, TR-MM #5, TR-MM #6 These mitigation measures propose to improve intersections, traffic lights and lane movement.	Less Than Significant
Air Quality and Global Climate Change		
Construction Impacts		
AQ #1: Construction would exceed the CEQA emissions thresholds for VOCs and NOx. Therefore, it could potentially cause violations of NO ₂ and O ₃ air quality standards or contribute substantially to NO ₂ and O ₃ existing or projected air quality violations.	AQ-MM #2: Reduce VOC Emissions from Paint. AQ-MM #4: Reduce Criteria Exhaust Emissions from Construction Equipment. AQ-MM #5: Reduce Criteria Exhaust Emissions from On-Road Construction Equipment.	Significant
AQ #2: Construction would exceed the CEQA emissions thresholds for PM ₁₀ and PM _{2.5} . Therefore, it could potentially cause violations of PM ₁₀ and PM _{2.5} air quality standards or contribute substantially to existing or projected PM ₁₀ and PM _{2.5} violations.	AQ-MM #1, AQ-MM #3, AQ-MM #4, AQ-MM #5 These mitigation measures propose to reduce dust and PM during construction.	Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
AQ #3: Material hauling outside the SJVAB would exceed CEQA emission thresholds for NO _x in the Bay Area AQMD, East Kern APCD, Mojave Desert AQMD, and the South Coast AQMD for certain hauling scenarios.	AQ-MM #5: Reduce Criteria Exhaust Emissions from On-Road Construction Equipment. AQ-MM #9: Purchase offsets for emissions associated with hauling ballast material in SCAQMD.	Less Than Significant/Significant
AQ #4: Construction of the HST alternatives would exceed the CEQA emissions thresholds for VOC and NO _x . Therefore, it would conflict with the 1-hour Ozone Attainment Plan and the 8-hour Ozone Attainment Plan.	AQ-MM #2: Reduce VOC Emissions from Paint. AQ-MM #4: Reduce Criteria Exhaust Emissions from Construction Equipment. AQ-MM #5: Reduce Criteria Exhaust Emissions from On-Road Construction Equipment.	Significant
AQ #5: Construction of the HST alternatives would exceed the CEQA emissions thresholds for PM ₁₀ and PM _{2.5} . Therefore, it would conflict with the PM ₁₀ and PM _{2.5} Attainment Plans.	AQ-MM#1, AQ-MM#3, AQ-MM#4, AQ-MM#5 These mitigation measures propose to reduce dust and PM during construction.	Significant
AQ # 6: Construction of the alignment may expose sensitive receptors to temporary substantial pollutant concentrations.	AQ-MM #8: Reduce the Potential Impact of Concrete Batch Plants.	Less than significant
Project Impacts		
AQ #7: Operation of the HMF may expose sensitive receptors within 1000 ft from the HMF boundary to substantial TAC pollutant concentrations.	AQ-MM #6: Reduce the Potential Impact of Toxics. AQ-MM #7: Reduce the Potential Impact of Stationary Sources.	Less than significant
AQ #8: Operation of the HMF may cause the total PM ₁₀ and PM _{2.5} ambient concentrations exceed CAAQS due to the existing exceedances in the area.	AQ-MM #7: Reduce the Potential Impact of Stationary Sources.	Significant
Noise and Vibration		
Construction Impacts		
N&V #1: Construction Noise	N&V-MM#1: Construction noise mitigation measures.	Less than significant
N&V #2: Construction Vibration	N&V-MM#2: Construction vibration mitigation measures.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Project Impacts		
N&V #3: Number of moderate and severe operational noise impacts to sensitive receivers.	N&V-MM #3 through N&V-MM #7 These mitigation measures proposed to decrease noise impacts to sensitive receivers.	Potentially Significant
N&V #4: Number of moderate and severe operational vibration impacts to sensitive receivers.	N&V #8: Implement project vibration mitigation.	Potentially Significant
Electromagnetic Fields and Electromagnetic Interference		
Construction Impacts		
There are no construction impacts for electromagnetic fields and electromagnetic interference.	No mitigation required	N/A
Project Impacts		
EMF/EMI #1: Effects on workers with implanted medical devices.	EMF/EMI-MM #1: Protect workers with implanted medical devices.	Less than Significant
EMF/EMI #2: Impacts to sensitive medical devices or imaging equipment.	EMF/EMI-MM #2: Protect sensitive equipment.	Less than Significant
Public Utilities and Energy		
Construction Impacts		
There are no construction impacts for public utilities and energy.	No mitigation required	N/A
Project Impacts		
There are no project impacts for public utilities and energy.	No mitigation required	N/A
Biological Resources and Wetlands		
Construction Impacts		
Special-Status Plants		
BIO #1: Number of acres impacted that has potential to support special-status plant species.	AQ-MM#1, AQ-MM#3, Bio-MM#16, Bio-MM#17, Bio-MM#51, WR-MM#1 These mitigation measures propose to reduce dust and require pre-construction surveys.	Less than Significant
Special-Status Wildlife Species		
BIO #2: Construction would disturb suitable habitat that has potential to support special-status invertebrate species.	AQ-MM #1, AQ-MM #3, Bio-MM #18, through Bio-MM #21, Bio-MM #44, Bio-MM #45, Bio-MM #46, Bio-MM #52, Bio-MM #53, Bio-MM #59, Bio-MM #61, WR-MM #1 These mitigation measures propose to reduce dust, require pre-construction surveys, and require restoration after construction.	Less than Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
BIO #3: Construction would disturb the suitable habitat that has potential to support special-status reptiles and amphibian species.	Bio-MM #22 through Bio-MM #26, Bio-MM #45, Bio-MM #46, Bio-MM #54, Bio-MM #55, Bio-MM #61 These mitigation measures propose to require pre-construction surveys and require restoration after construction.	Less than Significant
BIO #4: Construction would disturb habitat that has the potential to support special-status fish (i.e., Kern brook lamprey) species.	Bio-MM #44, Bio-MM #45, Bio-MM #46, Bio-MM #59, Bio-MM #60, Bio-MM #61, WR-MM #1, WR-MM #2 These mitigation measures propose to require restoration after construction.	Less than Significant
BIO #5: Construction would disturb suitable habitat that has potential to support nesting special-status bird species (including raptors).	Bio-MM #27 through Bio-MM #34, Bio-MM #56, Bio-MM #57 These mitigation measures propose require pre-construction surveys and require restoration after construction.	Less than Significant
Bio#6: Construction would disturb suitable habitat that has the potential to support special-status mammal species.	Bio-MM #35 through Bio-MM #43, Bio-MM #58 These mitigation measures propose to require pre-construction surveys and require restoration after construction.	Less than Significant
Special-Status Plant Communities		
BIO #7: Number of acres disturbed that supports special-status plant communities and riparian areas.	Bio-MM #16, Bio-MM #44, Bio-MM #45, Bio-MM #46, Bio-MM #51, Bio-MM #59, Bio-MM #60, Bio-MM #61 These mitigation measures propose to require pre-construction surveys and require restoration after construction.	Less than Significant
Jurisdictional Waters		
BIO #8: Number of acres directly and indirectly impacted that contain jurisdictional waters.	Bio-MM #44, Bio-MM #45, Bio-MM #46, Bio-MM #59, Bio-MM #60, Bio-MM #61, WR-MM #1, WR-MM #2 These mitigation measures propose to require pre-construction surveys and require restoration after construction.	Less than Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Critical Habitat		
BIO #9: Construction would disturb critical habitat for vernal pool branchiopods.	Bio-MM #18, Bio-MM #19, Bio-MM #20, Bio-MM #46, Bio-MM #52, Bio-MM #61 These mitigation measures propose to require pre-construction surveys and require restoration after construction.	Less than Significant
Conservation Areas		
BIO #10: Number of acres located in USFWS recovery plans.	Construction and Project Period Mitigation Measures Bio-MM #16 through Bio-MM #64 These mitigation measures propose to require pre-construction surveys and require restoration after construction.	Less than Significant
BIO #12: Construction would disturb portions of habitat conservation plan areas.	Construction and Project Period Mitigation Measures Bio-MM #16 through Bio-MM #64 These mitigation measures propose to require pre-construction surveys and require restoration after construction.	Less than Significant
Protected Trees		
BIO #13: Construction of the HST alternatives would disturb protected trees.	Bio-MM #47: Monitoring of Protected Trees. Bio-MM #62: Compensate for Impacts to Protected Trees.	Less than Significant
Wildlife Movement Corridors		
BIO #14: Construction would result in site preparation activities that would temporarily obstruct or startle wildlife and reduce the functionality of wildlife movement corridors and habitat linkages.	Bio-MM #48, Bio-MM #49, Bio-MM #50, Bio-MM #63, Bio-MM #64 These mitigation measures propose to implement measures to maintain wildlife movement.	Less than Significant
Project Impacts		
Special-Status Plant Species		
BIO #15: Number of acres impacted that has potential to support special-status plant species.	AQ-MM #1, AQ-MM #3, Bio-MM #16, Bio-MM #17, Bio-MM #51, WR-MM #1 These mitigation measures propose to reduce dust and require pre-construction surveys.	Less than Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Special-Status Wildlife Species		
BIO #16: Impacts would permanently impact suitable habitat that has the potential to support special-status invertebrate species.	AQ-MM #1, AQ-MM #3, Bio-MM #18, through Bio-MM #21, Bio-MM #44, Bio-MM #45, Bio-MM #46, Bio-MM #52, Bio-MM #53, Bio-MM #59, Bio-MM #61 These mitigation measures propose to reduce dust, require pre-construction surveys, and require restoration after construction.	Less than Significant
BIO #17: Impacts would permanently impact suitable habitat that has the potential to support special-status reptiles and amphibian species.	Bio-MM #22 through Bio-MM #26, Bio-MM #45, Bio-MM #46, Bio-MM #54, Bio-MM #55, Bio-MM #61 These mitigation measures propose to require pre-construction surveys and require restoration after construction.	Less than Significant
BIO #18: Impacts would permanently impact suitable habitat that has the potential to support special-status fish species (i.e., Kern brook lamprey).	Bio-MM #44, Bio-MM #45, Bio-MM #46, Bio-MM #59, Bio-MM #60, Bio-MM #61, WR-MM #1, WR-MM #2 These mitigation measures propose to require pre-construction surveys and require restoration after construction.	Less than Significant
BIO #19: Impacts would permanently impact suitable habitat that has the potential to support special-status bird species (including raptors).	Bio-MM #27 through Bio-MM #34, Bio-MM #56, Bio-MM #57 These mitigation measures propose require pre-construction surveys and require restoration after construction.	Less than Significant
BIO #20: Impacts would permanently impact suitable habitat that has the potential to support special-status mammal species.	Bio-MM #35 through Bio-MM #43, Bio-MM #58 These mitigation measures propose require pre-construction surveys and require restoration after construction.	Less than Significant
Special-Status Plant Communities		
BIO #21: Number of acres disturbed that supports special-status plant communities and riparian areas.	Bio-MM #16, Bio-MM #44, Bio-MM #45, Bio-MM #46, Bio-MM #51, Bio-MM #59, Bio-MM #60, Bio-MM #61 These mitigation measures propose to require pre-construction surveys and require restoration after construction.	Less than Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Jurisdictional Waters		
BIO #22: Number of acres directly and indirectly impacted that contain jurisdictional waters	Bio-MM #44, Bio-MM #45, Bio-MM #46, Bio-MM #59, Bio-MM #60, Bio-MM #61, WR-MM #1, WR-MM #2 These mitigation measures propose to require pre-construction surveys and require restoration after construction.	Less than Significant
Critical Habitat		
BIO #23: Project impacts to critical habitat for vernal pool species.	Bio-MM #18, Bio-MM #19, Bio-MM #20, Bio-MM #46, Bio-MM #52, Bio-MM #61 These mitigation measures propose to require pre-construction surveys and require restoration after construction.	Less than Significant
Conservation Areas		
BIO #24: Number of acres that would disturb portions of recovery plans.	Construction and Project Period Mitigation Measures Bio-MM #16 through Bio-MM #64 These mitigation measures propose to require pre-construction surveys and require restoration after construction.	Less than Significant
BIO #25: Number of acres that would disturb portions of the Allensworth Ecological Reserve.	PC-MM #1: Compensation for Staging in Park Property for Construction. PP-MM #1: Acquisition of Park Property.	Less than Significant
BIO #26: Project impacts from the BNSF Alternative would disturb portions of habitat conservation plans.	Construction and Project Period Mitigation Measures Bio-MM #16 through Bio-MM #64 These mitigation measures propose to require pre-construction surveys and require restoration after construction.	Less than Significant
Protected Trees		
BIO #27: Impacts would permanently affect protected trees.	Bio-MM #47: Monitoring of Protected Trees. Bio-MM #62: Compensate for Impacts to Protected Trees.	Less than Significant
Wildlife Movement Corridors		
BIO #28: Impacts would permanently reduce the functionality of wildlife movement corridors and habitat linkages.	Bio-MM #48, Bio-MM #49, Bio-MM #50, Bio-MM #63, Bio-MM #64 These mitigation measures propose to implement measures to maintain wildlife movement.	Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Hydrology and Water Resources		
Construction Impacts		
There are no construction impacts for hydrology and water quality.	No mitigation required	N/A
Project Impacts		
There are no project impacts for hydrology and water quality.	No mitigation required	N/A
Geology, Soils, and Seismicity		
Construction Impacts		
There are no construction impacts for geology, soils, and seismicity.	No mitigation required	N/A
Project Impacts		
There are no project impacts for geology, soils, and seismicity.	No mitigation required	N/A
Hazardous Materials and Wastes		
Construction Impacts		
HMW #1: Handling of Extremely Hazardous Materials within 0.25 mile of a School	HMW-MM #1: No use of extremely hazardous substances or a mixture thereof in a quantity equal to or greater than the state threshold quantity within 0.25 mile of a school.	Less than significant
Project Impacts		
There are no project impacts for hazardous materials and wastes.	No mitigation required	N/A
Safety and Security		
Construction Impacts		
There are no construction impacts for safety and security.	No mitigation required	N/A
Project Impacts		
S&S #1: Proximity of a private airstrip to HST facilities.	S&S-MM #1: Compensation for loss of private airstrip.	Less than Significant
S&S #2: Increased demand for fire, rescue, and emergency services at stations and HMFs	S&S-MM #2: Pay impact fee to local fire, rescue, and emergency service providers for services at stations and at the HMF.	Less than Significant
Socioeconomic, Communities, and Environmental Justice		
Construction Impacts		
There are no construction impacts for socioeconomics, communities, and environmental justice.	SO-MM #1: Develop and implement a construction management plan. SO-MM #2: Develop a relocation mitigation plan.	N/A

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Project Impacts		
SO #1: Division of existing community. Ponderosa Rd./Edna Way, northeast of Hanford and the Newark Ave. vicinity northeast of Corcoran. Displacement of residents of small tightly knit communities.	SO-MM #3: Implement measures to reduce impacts associated with the division of existing communities in the unincorporated areas northeast of Hanford and Corcoran.	Significant
SO #2: Division of existing community in Bakersfield's Northeast District.	SO-MM #4: Implement measures to reduce impacts associated with the division of existing communities in the Northeast District of Bakersfield.	Significant
SO #3: Division of existing community in Bakersfield's Northwest District.	SO-MM #5: Implement measures to reduce impacts associated with the division of existing communities in the Northwest District of Bakersfield.	Significant
SO #4: Displacement of Bakersfield High School's Industrial Arts building.	SO-MM #6: Implement measures to reduce impacts associated with the displacement of Bakersfield High School facilities.	Less than Significant
SO #5: Displacement of the Mercado Latino Tianguis.	SO-MM #6: Implement measures to reduce impacts associated with the displacement of the Mercado Latino Tianguis.	Less than Significant
SO #6: Displacement of the Fresno Rescue Mission and associated facilities.	SO-MM #6: Implement measures to reduce impacts associated with the displacement of the Fresno Rescue Mission and associated facilities.	Less than Significant
SO #7: Displacement of Mercy Hospital medical complex facilities.	SO-MM #6: Implement measures to reduce impacts associated with the displacement of Mercy Hospital medical facilities.	Less than Significant
SO #8: Displacement of religious facilities.	SO-MM #6: Implement measures to reduce impacts associated with the displacement of religious facilities.	Less than Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Station Planning, Land Use, and Development		
Construction Impacts		
There are no construction impacts for station planning, land use, and development.	No mitigation required	N/A
Project Impacts		
There are no project impacts for station planning, land use, and development.	No mitigation required	N/A
Agricultural Lands		
Construction Impacts		
There are no construction impacts for agricultural lands.	No mitigation required	N/A
Project Impacts		
AG #1: Permanent Conversion of Agricultural Land to Nonagricultural Use.	AG-MM #1: Preserve the total amount of prime, statewide, local, and unique farmland.	Significant
AG #2: Permanent Conversion of Agricultural Land from Parcel Splits.	AG-MM #2: Consolidate Non-Economic Remnants.	Significant
Parks, Recreation, and Open Space		
Construction Impacts		
PK #1: Construction activities would create noise at Father Wyatt Park.	Mitigation Measures as outlined in Section 3.4, Noise and Vibration.	Less than Significant
PK #2: Construction activities would create closures of some areas of Kern River Parkway, including bike and equestrian facilities.	PC-MM #1: Compensation for Staging in Park Property for Construction.	Less than Significant
PK #3: Construction activities would create noise at Bakersfield High School.	Mitigation Measures as outlined in Section 3.4, Noise and Vibration.	Significant
Project Impacts		
PK #4: The project would require the acquisition of approximately 1.7 acres of Allensworth State Historic Park.	PP-MM#1: Acquisition of Park Property. PP-MM#2: Avoidance of Allensworth State Historic Park.	Less than Significant
PK #5: The project would require the acquisition of approximately 7.3 acres of Allensworth Ecological Reserve.	PP-MM#1: Acquisition of Park Property.	Less than Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
PK #6: The project would introduce a modern feature not consistent with the historic atmosphere of Allensworth State Historic Park.	Mitigation Measures as outlined in Section 3.16, Aesthetics and Visual Resource	Significant
PK #7: The project would create an increase in usage that would result in physical deterioration of the Bakersfield Amtrak Station Playground.	PP-MM #3: Collect Additional Maintenance Funds.	Less than Significant
Aesthetics and Visual Quality		
Construction Impacts		
VQ #1: Visual disturbance during construction.	VQ-MM #1: Minimize Visual Disruption during Construction.	Less than Significant
VQ#2: Nighttime Lighting during construction.	VQ-MM #1: Minimize Visual Disruption during Construction.	Less than Significant
Project Impacts		
VQ #3: Lower visual quality in the Central Fresno Landscape Unit.	VQ-MM #2, VQ-MM #3, VQ-MM #3a, VQ-MM #3b, VQ-MM #4a, VQ-MM #6 These mitigation measures propose to require landscaping and treatment for sound walls and elevated structures.	Less than Significant
VQ #4: Lower visual quality in the Rural Valley/Agricultural Landscape Unit.	VQ-MM #2, VQ-MM #3, VQ-MM #3a, VQ-MM #3b, VQ-MM #4a, VQ-MM #4b, VQ-MM #5, VQ-MM #6, VQ-MM #7 These mitigation measures propose to require landscaping and treatment for sound walls and elevated structures.	Significant
VQ #5: Impacts on existing visual character or quality of the site and its surroundings due to at-grade and elevated structures, HST, road overcrossings, or other prominent project features.	VQ-MM #3, VQ-MM #3a, VQ-MM #3b, VQ-MM #4a, VQ-MM #4b, VQ-MM #5, VQ-MM #6 These mitigation measures propose to require landscaping and treatment for sound walls and elevated structures.	Significant (BNSF, Corcoran Elevated, Corcoran Bypass, Wasco-Shafter Bypass) Less than significant (Allensworth Bypass)
VQ #6: Lower visual quality in the Rosedale, Kern River, and Central Bakersfield Landscape Units.	VQ-MM #2, VQ-MM #3, VQ-MM #3a, VQ-MM #3b, VQ-MM #4a, VQ-MM #6 These mitigation measures propose to require landscaping and treatment for sound walls and elevated structures.	Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
VQ #7: The HST project would create a new source of substantial light and glare.	VQ-MM #2: Minimize Light Disturbance.	Less than significant
VQ #8: TPSS would alter visual character or block views.	VQ-MM #7: Screen Traction Power Distribution Stations.	Less than significant
VQ #9: Lower visual quality due to HMF alternatives.	VQ-MM #1: Minimize Visual Disruption during Construction. VQ-MM #2: Minimize Light Disturbance. VQ-MM #4a: Replant Unused Portions of Lands Acquired for the HST.	Less than significant
VQ #10: Noise wall would block views.	VQ-MM #3, VQ-MM #3a, VQ-MM #4a, VQ-MM #6 These mitigation measures propose to require landscaping and treatment for sound walls and elevated structures.	Significant
Cultural and Paleontological Resources		
Construction Impacts		
CUL #1: Effect on Significant Prehistoric and Historic-Era Archaeological Resources During Construction.	Arch-MM #1, Arch-MM #2, Arch-MM #3, Arch-MM #4 These mitigation measures propose to conducting training, planning, and monitoring prior to construction.	Less than Significant
CUL #2: Effect on Historically Significant Built- Environment Resources During Construction.	Hist-MM #1, Hist-MM #3, Hist-MM #11	Less than Significant
	Hist-MM #2, Hist-MM #4, Hist-MM #5, Hist-MM #6, Hist-MM #7, Hist-MM #8, Hist-MM #9, Hist-MM #10 These mitigation measures propose to minimize impacts through construction methods, movement of structures, and preparing and submitting plans.	Significant and Unavoidable

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
CUL #3: Effect on Paleontological Resources during Construction.	<p>Pal-MM #1: Engage paleontological resources specialist to direct monitoring during construction.</p> <p>Pal-MM #2: Prepare and implement a paleontological resource monitoring and mitigation plan (PRMMP).</p> <p>Pal-MM #3: Halt construction when paleontological resources are found.</p>	Less than Significant
Project Impacts		
CUL #4: Effect on Historically Significant Built-Environment Resources During Operation.	<p>Hist-MM #2: Develop Protection and Stabilization Measures</p> <p>Hist-MM #8 : Prepare Historic Structure Reports</p>	N/A
Regional Growth		
Construction Impacts		
There are no construction impacts for regional growth.	No mitigation required	N/A
Project Impacts		
There are no project impacts for regional growth.	No mitigation required	N/A
Cumulative Impacts		
Construction Impacts		
Cumulative noise impacts.	Coordinate HST activities with other nearby, concurrent construction projects to the extent feasible.	Significant and Unavoidable
Cumulative safety and security impacts.	Coordinate with local jurisdictions where road closures would be required to ensure that emergency response services are not disrupted.	Less than Significant
Cumulative socioeconomic, communities, and environmental justice impacts.	Coordinate HST activities with other nearby, concurrent construction projects to the extent feasible.	Less than Significant
Project Impacts		
There are no construction impacts for cumulative impacts.	No mitigation required	N/A
<p>Acronyms:</p> <p>CEQA = California Environmental Quality Act</p> <p>CRHR = California Register of Historical Resources</p> <p>HABS = Historic American Buildings Survey</p> <p>HAER = Historic American Engineering Record</p> <p>HALS = Historic American Landscapes Survey</p> <p>HST = high-speed train</p> <p>NRHP = National Register of Historic Places</p>		

Table S-4
Environmental Impacts Differentiating HMF Alternatives

Impact	HMF Alternatives					Mitigation Measure	CEQA Level of Significance after Mitigation
	Fresno	Hanford	Wasco	Shafter East	Shafter West		
Transportation and Traffic							
Project Impacts							
TR #3: Number of HMF Site Roadway Impacts.	0	1	0	0	0	TR-MM #7: Add New Lanes to roadway.	Less than Significant
TR #3: Number of HMF Site Intersection Impacts.	2	2	2	1	1	TR-MM #2 through TR-MM #6	Less than Significant
Noise and Vibration							
Project Impacts							
N&V #3: Number of sensitive receivers impacted by HMF Operational Noise.	100	6	327	6	5	N&V-MM#3: Implement California High-Speed Train Project Noise Mitigation Guidelines. N&V-MM#4: Vehicle Noise Specification. N&V-MM#5: Special Trackwork at Crossovers and Turnouts.	Potentially Significant

Table S-4
Environmental Impacts Differentiating HMF Alternatives

Impact	HMF Alternatives					Mitigation Measure	CEQA Level of Significance after Mitigation
	Fresno	Hanford	Wasco	Shafter East	Shafter West		
Biological Resources and Wetlands							
Project Impacts							
Bio #29: Impacts to areas that have potential to support special-status plant species	Yes	Yes	No	No	No	AQ-MM#1, AQ-MM#3, Bio-MM#16, Bio-MM#17, Bio-MM#51, WR-MM#1	Less than Significant
Bio #29: Impacts to areas that support special-status plant communities.	Yes	Yes	No	No	No	Bio-MM #16, Bio-MM #44, Bio-MM #45, Bio-MM #46, Bio-MM #51, Bio-MM #59, Bio-MM #60, Bio-MM #61	Less than Significant
Bio #29: Impacts to jurisdictional waters.	Yes	Yes	Yes	Yes	No	Bio-MM#44 through Bio-MM#46, Bio-MM#59 through Bio-MM#61, WR-MM#1, WR-MM#2	Less than Significant
Bio #29: Impacts to a recovery plan.	No	No	Yes	No	No	Bio-MM#16 through Bio-MM#64.	Less than Significant
Bio #29: Impacts to a habitat conservation plan area.	Yes	No	Yes	Yes	Yes	Bio-MM#16 through Bio-MM#64.	Less than Significant

Table S-4
Environmental Impacts Differentiating HMF Alternatives

Impact	HMF Alternatives					Mitigation Measure	CEQA Level of Significance after Mitigation
	Fresno	Hanford	Wasco	Shafter East	Shafter West		
Bio#29: Impacts to protected trees.	Yes	No	No	No	No	Bio-MM#47, Bio-MM#62	Less than Significant
Bio#29: Impacts to a wildlife movement corridor.	No	No	Yes	No	No	Bio-MM#49, Bio-MM#50	Less than Significant
Hazardous Materials and Wastes							
Project Impacts							
HMW #1: Handling of Extremely Hazardous Materials within 0.25 mile of a School.	No	No	Yes	No	No	HMW-MM #2: No use of extremely hazardous substances or a mixture thereof in a quantity equal to or greater than the state threshold quantity	Significant and Unavoidable
Agricultural Impacts							
Project Impacts							
AG #1: Permanent Conversion of Agricultural Land to Nonagricultural Use. Operation of the project would affect Important Farmland by converting to nonagricultural uses.	409 acres impacted	465 acres impacted	409 acres impacted	490 acres impacted	457 acres impacted	Ag-MM#1: Preserve the Total Amount of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland.	Significant and Unavoidable
Acronyms: CEQA = California Environmental Quality Act HMF = heavy-maintenance facility							